STATE OF WASHINGTON
PROFESSIONAL EDUCATOR STANDARDS BOARD

Joint Mathematics Action Plan

Building the Proper Foundation

November 30, 2006

PRELIMINARY JOINT MATHEMATICS ACTION PLAN

Building the Proper Foundation

A. Introduction:

The purpose of the Joint Mathematics Action Plan is to outline the steps necessary to bring Washington to the forefront of mathematics education. The Office of Superintendent of Public Instruction (OSPI), Professional Educator Standards Board (PESB), and the State Board of Education (SBE) will agree on a common strategy – the accomplishment of which can be addressed by each agency as appropriate given their respective roles. Continued communication among the agencies throughout the implementation process is necessary to enhance and ensure the success of this common strategy. The actions are also intended to reflect and expand upon the strategies of the Washington Learns Steering Committee.

We need to build a strong statewide system including all stakeholders, educators at all levels, legislators, parents, community members, and businesses to increase mathematics achievement in all schools and for all demographic groups. Clearly, there is no "silver bullet", but there is a set of absolutely critical elements – many of which are not in place currently. Making major progress will take much work and we should approach it together – as one K–12 system, with strong connections to early learning and higher education.

The actions we need to take will require varying levels of time and resources to fully implement. It will be important to approach the work with a sense of urgency so we can help students as much as possible with every step we take. It may require some new approaches to implementation in order to make rapid progress.

It is important to note that by insisting on better performance and continuous improvement we do not need to throw away current effective practices – in many schools great mathematics education is occurring, we hope to enhance and expand on what is already working.

We must build an accountability system that defines the actions needed to make a difference in improving student achievement in mathematics. We will develop measures for the work we are proposing and create a feedback loop that will identify successes and areas of needed improvement.

We must honor the things we have done well and face with clarity the challenges before us. This proposal outlines:

- Current challenges
- Joint actions to address these challenges
- Timelines for action (available January 2007)
- Monitoring results, goals, and performance indicators (available January 2007)

B. The Current Challenge:

Students Gaining the Knowledge and Skills Needed to Meet High School and Beyond Performance Standards

In June 2006 51 percent (37,928 students) of the Class of 2008 passed the 10th grade mathematics Washington Assessment of Student Learning (WASL). Forty-nine percent of seventh graders passed the mathematics WASL and 59 percent of fourth graders passed the mathematics WASL. While progress has continued over the last four years, the results show much work needs to be done. Results are slightly better in the elementary levels than middle school and high school, but progress has been relatively flat for the last few years. Table 1 below, highlights the percent of students meeting the mathematics WASL standard over the last four years by the fourth, seventh, and 10th grades.

Table 1

Percent of Students Who Met Mathematics Standard			
School Year	**4th Grade Mathematics**	**7th Grade Mathematics**	**10th Grade Mathematics**
2002 – 03	55.2%	36.8%	39.4%
2003 – 04	59.9%	46.3%	43.5%
2004 – 05	60.8%	50.8%	47.5%
2005 – 06[1]	58.9%	48.5%	51.0%

Source: OSPI School Report Card

As of June 2006 36,383 10th graders had not met the mathematics WASL standard. Those who did not meet standard are represented in Table 2 below.

Table 2

Students Not Meeting Standard on the 10th Grade Mathematics WASL June 2006		
	Number	**Percent**
Level 2	17,767	24%
Level 1	14,866	20%
No Score	3,750	5%
Total:	**36,383**	**49%**

Source: OSPI School Report Card

[1] Numbers used in Tables 1, 2, and 3 are as of June 2006. Retake data is not included.

In addition, many subcategories of 10th grade students – low income, Native American, African American, Hispanic, Special Education, Bilingual, and Migrant were even less successful with passage rates ranging from 12 percent to 30 percent.

While these students will have additional opportunities to retake the WASL or use the alternative assessments, a number of them will still not meet standard thus not obtain the Certificate of Academic Achievement necessary to receive a high school diploma. For details by category see Table 3 below.

Table 3

June 2006 Results: Student Subgroups Meeting Standard on the 10th Grade Mathematics WASL			
Subgroup	**% Meeting Level 3 & 4**	**% Meeting Level 2**	**% Meeting Level 1 (or no score)**
African American	23%	26%	51%
Asian	60%	21%	19%
Hispanic	25%	26%	49%
Low Income	30%	27%	43%
Limited English Programs	13%	26%	66%
Native American	30%	26%	44%
Special Education	12%	15%	73%
White	57%	24%	19%
Female	50%	25%	25%
Male	52%	23%	25%
ALL STUDENTS	**51%**	**24%**	**25%**

Source: OSPI School Report Card

Once students enter public colleges and universities, their poor performance in mathematics continues to be reflected in the percent of students taking remedial mathematics, which is defined as Algebra II or lower. In 2003 31 percent of Washington students who entered a college or university within one year of graduation had to take remedial mathematics.[2]

Why are students not performing better in mathematics? A number of system challenges have been identified including the following:

- There are questions about the appropriateness of the standards.
- The current system lacks the ability to ensure students actually take mathematics classes and curriculum aligned with the Essential Academic Learning Requirements (EALRs) and the Grade Level Expectations (GLEs).
- There is a lack of highly-qualified mathematics teachers.

[2] Washington State High School Graduate Follow Up Study Class of 2003 and Beyond Study. http://www.sesrc.wsu.edu/gfs/

- The high school mathematics graduation requirement is "seat time" based whereas the WASL is competency based. In addition, the high school mathematics graduation requirement is not aligned with college entry requirements.
- Teachers lack classroom assessments and intervention strategies to monitor and help individual student performance.
- The state lacks adequate management information to track effective practices within the K–12 system. There needs to be better data on teacher credentials, student course taking, and remedial interventions being provided.
- Community members have differing expectations about the kind of mathematics students need to learn.

These issues are addressed below in the joint plan of action.

C. Joint Plan of Action:

I. Align Standards, Curriculum, and Assessment

The state holds school districts responsible for multiple conflicting standards (EALRs, GLEs, high school graduation requirements, college admissions, and placement tests). Local districts choose the curriculum and instructional materials for teachers to use. These choices are not always aligned with state standards. Teachers need more immediate ways than the annual WASL to assess student progress.

a. Clarify and revise the mathematics standards.

OSPI, in collaboration with the State Board of Education, will clarify and revise the mathematics standards to ensure they are clear and at an appropriate level. Washington's standards need to be benchmarked against the best of national and international mathematics standards.

When clarifying and revising the standards, OSPI will:

- Participate in the international benchmarking system of Trends in International Math and Science Study (TIMSS) and/or the Program for International Student Assessment (PISA).
- Analyze the National Council of Teachers of Mathematics (NCTM) "Focal Points" work as well as the recommendations of the President's Mathematics Panel.
- Convene an independent national panel with diverse perspectives to get a balanced review of the mathematics standards to inform the debate about how mathematics is taught.
- Convene individuals and mathematics experts in Washington State ranging from higher education institutions, industry, parents, the SBE, highest-achieving K–12 schools, and skills centers to determine comparability with national and international standards and define world class standards.
- Provide public forums for feedback as reviews occur to revise and clarify the standards.

b. Revise the mathematics WASL as appropriate after examining standards.

OSPI will, as necessary, revise the mathematics WASL so it aligns with the required standards so they are consistent with accepted testing standards.

c. Provide aligned mathematics curriculum and instructional intervention materials.

- OSPI will select, and supplement as necessary, a K–12 mathematics curricular menu (instructional materials) which requires a narrowed list of aligned texts and materials. These will be aligned with the standards and the assessment.
- OSPI, through the Educational Service Districts (ESDs) and school districts, will provide professional development for implementing the curricular menu. In this effort, OSPI will identify intervention strategies for increasing computational fluency.
- Consistent with the accountability system developed by the State Board, require districts to choose from the curricular menu under the achievement and improvement index established as part of the accountability system.
- Provide funding to the extent funds are appropriated for districts to purchase materials.
- Seek legislation to authorize OSPI to enter into master agreements with the publisher(s) to reduce costs.
- Seek legislative funding for online options to use in districts and by parents including instructional resources to support mathematics teaching and learning.

d. Provide formative and diagnostic assessments.

OSPI will identify (create if necessary) and disseminate formative and diagnostic assessments teachers can use to track student progress and tailor instruction to individual students.

II. Ensure Quality Teaching

Ensuring prospective and current teachers have the capacity to teach mathematics so as to dramatically improve student achievement requires a combination of high-quality preservice preparation and ongoing professional development. To that end, OSPI and the PESB will work collaboratively.

The PESB will:

a. Improve teacher recruitment and retention.

The PESB will request that the Legislature create scholarships, increase funding for conditional loans, provide differential pay to attract mathematics teaching talent, and take other innovative actions to recruit and retain mathematics teachers.

b. Expand the Alternative Routes Program.

The PESB will request that the Legislature increase funding for the Alternatives Route Program, with a particular focus on new recruitment strategies for prospective mathematics teachers, including possible incentives for business and industry.

c. **Require mathematics teacher preparation programs address the curricular menu** adopted by the SBE and the use of formative and summative student performance data to inform instruction.

d. **Provide university faculty professional development.**

The PESB will support an OSPI request for funds to provide professional development opportunities for university mathematics education faculty on an annual basis.

e. **Adopt more rigorous and relevant mathematics endorsement requirements** by completing work to revise the endorsement competencies for elementary, middle level, and secondary mathematics. The new competencies will be based on national mathematics standards. The PESB will adopt a process for reviewing and revising these competencies on a regular cycle.

f. **Align the mathematics content test for teachers.**

Align the required mathematics portion of the content tests for elementary education, middle level mathematics/science, and secondary mathematics endorsements with the new competencies.

g. **Integrate mathematics content** into other content areas by incorporating language into the revised knowledge and skill standards for teacher preparation programs.

h. **Eliminate out-of-endorsement assignments by:**

- Advocating for the funding of a state-level data system to track educator assignments and credentials.
- Limiting the opportunity for individuals who are not fully endorsed to teach mathematics.
- Placing a time limit on the assignment of science teachers to teach mathematics without earning a mathematics endorsement.
- Creating more options, access, and incentives for educators to add a mathematics endorsement to their certificate.
- Examining the influence of local hiring practices and local contract agreements related to assignment.

i. **Raise standards for continuing education providers** by adopting a new process and new standards for state approval and evaluation of continuing education providers to ensure teachers have access to high-quality continuing education opportunities in mathematics.

OSPI will:

j. **Implement a statewide professional development system.**

OSPI will implement a statewide, strategic, professional development system that is focused, sustained, and job-embedded. In partnership with the ESDs this professional development will provide opportunities that deepen teacher knowledge of mathematics, increase teachers' skills in how to teach mathematics, and improve understanding about how children learn mathematics.

The plan will provide assistance in implementing the mathematics curricular menu choices, assessment tools, and intervention strategies. This training will be differentiated based on the individual needs of teachers. OSPI will request funding for teachers to attend or to pay for substitute teachers. By 2010 these professional development courses will be required for all mathematics teachers. All resources necessary for implementation of these newly learned techniques and skills will be provided to teachers.

k. Provide time for educators to identify and implement effective strategies to improve mathematics achievement.

OSPI recommends that the Legislature fund two additional days each year until it reaches a total of eight. These days will initially be focused on professional development in mathematics learning for all elementary and secondary mathematics teachers. These days will be available for all teachers who teach mathematics to collaboratively identify and implement actions to improve mathematics instruction and learning achievement in their schools.

III. Strengthen High School Mathematics

The requirements for high school graduation are not aligned to the standards and assessments for 10th grade mathematics. There are no state expectations for mathematics beyond a two-credit requirement and meeting the standards measured by the 10th grade WASL. This does not encourage students to accelerate their mathematics learning for college or post secondary training they may wish to pursue. Many students choose not to take mathematics in their senior year, which results in a loss of mathematical skill before they enter post-secondary institutions.

There is a disjuncture between the K–12 education system and postsecondary—both two- and four-year institutions. Students receive mixed signals about expectations and requirements because the two systems are not aligned. A student may complete all the requirements and meet all the standards to graduate from high school, including passing an exit examination and yet be required to take remedial courses in college. Colleges and universities have many different placement exams that students know little or nothing about. This adds to the students' confusion about what is expected.

Many students do not currently have access to advanced mathematics courses in their high school. This leads to an unequal playing field for those students when they enter postsecondary education.

To address these issues the State Board of Education recommends the following:

a. Revise Graduation Requirements

The State Board of Education envisions a two-step process. First, the Board shall immediately revise the Washington Administrative Code (WAC) to state explicitly that the two-credit mathematics graduation requirement is to be met by successful completion of mathematics classes that align with the mathematics GLEs for ninth and tenth grade.

To assist school districts, OSPI will publish an initial course list by March 1, 2007. Pursuant to OSPI guidance, districts may petition to add eligible courses by providing relevant course information to OSPI. This requirement shall take effect for the 2007–08 school year.

In addition, students will incorporate in their individual high school and beyond plan (required as a high school graduation requirement) the kinds of mathematics they need to take to prepare them for their first year after high school whether it be attending college, an apprenticeship program, or employment.

Second, the SBE will examine the high school mathematics graduation requirements as part of its study on a meaningful high school diploma due in 2007. It will examine content as well as credits required for mathematics. Washington Learns asked the Board to adopt international performance standards (benchmarked to TIMSS or PISA) for mathematics and science by December 2007. Washington Learns also assigned the SBE to amend the high school graduation requirements to include a minimum of three years of mathematics, which may include applied mathematics. As a part of the Board's work, it will focus on the competencies students need to graduate from high school to succeed in college or the workforce. The SBE may also look at other states and countries high school "graduation" requirements in mathematics.

b. Provide an opportunity for students to take a common college placement test.

Starting in the 2009–10 school year, it is recommended that the Legislature provide all high school students the opportunity to take a common college mathematics placement test. The purpose of this common diagnostic test with a common cutscore is to identify for students the level of college mathematics they are presently prepared for. Based on the result of this test, students can better select the proper level of mathematics instruction for their senior year to avoid remediation upon college entrance. Funding from the Legislature will be needed to pay for the cost of administering the placement tests. Washington Learns is asking the two-year and four-year colleges and universities to develop one college readiness test (subject to appropriations) that can be used for placement decisions.

c. Increase opportunities for students to take rigorous mathematics classes.

The SBE and OSPI recommend that the Legislature provide incentives for school districts to encourage Running Start mathematics courses for those students who are excelling in mathematics, and significantly increase the availability of rigorous mathematics classes and assessments. This includes the mathematics courses offered in Advanced Placement (AP) and in the International Baccalaureate (IB) programs.

IV. Deliver Efficient, Effective, and Equitable Instruction and Interventions

Students in the earlier grades lack access to Promoting Academic Success (PAS) funding to help when experiencing difficulty with mathematics based on the WASL results. While Learning Assistance Program (LAP) funds are allocated, they are not sufficient to meet the needs.

Currently, local school districts also lack knowledge about effective diagnostic assessments and intervention programs to help students improve their mathematics achievement.

a. Offer "segmented" mathematics assessments as part of an aligned mathematics class.

OSPI will implement the segmented mathematics WASL as soon as possible, starting no later than the 2007–08 school year and align the Level 2 remedial modules with the segmented WASL. The Legislature should authorize the segmented WASL to be

available in 2007–08 as an authorized alternative assessment method, subject to SBE approval. These courses should have smaller class sizes. All students enrolled in these courses should also be enrolled in a regular mathematics course.

b. Examine extended learning time opportunities

Seek funding to examine the use of the school day and year to increase the effectiveness of learning. Review extending the school year to minimize the learning loss that occurs due to a lengthy summer break. Investigate ways to make the use of each day as efficient as possible.

c. Continue to fund and improve the PAS program.

The Legislature should continue to fund the PAS program and provide additional funding for elementary and middle school. Districts should use the evaluation of the PAS program, as it becomes available, to strengthen the program. Require schools and school districts to use tested and effective remedial strategies in exchange for receipt of PAS funds. Tight quality control is needed through OSPI oversight.

d. Expand the availability of the instructional modules.

OSPI will provide Level 1 and Level 2 instructional modules to high schools and provide extensive professional development on how to use them effectively. The Level 1 modules need to be completed this school year so both Level 1 and Level 2 can be implemented in the summer of 2007 and in the 2007–08 school year.

Serious intervention efforts must start earlier (i.e., in elementary and middle schools) so learning deficiencies can be quickly remedied. The modules should be continually revised so they reflect the areas of greatest deficiency.

Using the high school modules as an example, instructional modules should be designed for Level 1 students in middle and primary grades.

e. Provide personalized intervention programs K–12.

OSPI will review, identify, and create if necessary, effective intervention programs and strategies that tailor instruction to the needs of individual students as identified in the diagnostic assessments. OSPI should consider online programs and other strategies and appropriate class sizes.

f. Address the unique needs of English Language Learners (ELL).

OSPI, PESB, the SBE, and the Legislature need to pay special attention to improving the education provided to non-English-speaking students. Graduation requirements as well as interventions need to be tailored for ELL students. State agencies will need to work with the federal government to change provisions for ELL students identified through No Child Left Behind.

V. Strengthen Accountability

Currently local school districts can choose the data system for entering their data. Eighty-five percent of the districts are on the Washington School Information Processing Cooperative. The larger districts have their own data system. The state has limited data on

students through OSPI's Core Student Record System. There is no automated system on teacher qualifications.

To ensure that policy decisions are data-driven and focused on increasing student achievement, the PESB and SBE will work with OSPI to develop and implement state-level capacity to collect and analyze critical data on students and teachers. The data on both students and teachers needs to be interconnected to identify effective teaching for student achievement.

VI. Community Outreach

Parents, community, and business leaders are acutely aware of the low performance of high school students on the mathematics WASL. To continue to receive positive support from these constituencies, information is needed to show them why students need to learn mathematics, what this should look like, and how they can support Washington's students.

Develop a Public/Private Partnership to inform legislators, parents, the general public, educators, and media about the importance of both computation and meaning in the K–12 mathematics curriculum. The partnership should work to:

- Stress the importance of every student learning to think mathematically.
- Emphasize students must learn BOTH concepts and computational fluency.
- Understand why mathematics helps students and the state to compete internationally.
- Have the tools to understand what their children are learning and how to help with homework.

Timelines and Performance Indicators will be available by January 2007